What can social network analysis reveal about the resources men and women scientists acquire through their personal relationships?

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Prepared for the 2009 Atlanta S&T Conference

ABSTRACT

What relationships do scientists build in order to further their productivity and career development? Individuals form networks of relationships that provide them with advice, support, and access to various work related resources (Seibert, Kraimer et al. 2001). The social network literature distinguishes between strong and weak network ties (Granovetter 1973; Burt 1992) that benefit an individual in the distinct ways providing various instrumental or expressive resources (Lin 2001). Less is said about the benefits of the multiplex ties, namely relationships that are determined by more than one type of the exchange. The purpose of this study is to explore the multiple dimensions of collaborative and career development relevant relationships among academic scientists. It explores the added value of having multi-dimensional or multiplex relationships with fellow scientists within and outside of ones own research institution for men and women academic scientists in six STEM fields

Cummings and Higgins (2006) found that individuals' personal network consist of an inner and outer core, and that the inner core is formed by stronger ties that provide more expressive and less instrumental support. This is consistent with the social network research suggests that different types of relationships provide different types of resources (Podolny and Baron 1997; Plickert, Côté et al. 2007) and that gender differences in network composition and structure, as well as effects of ties on outcomes exist (Lin 2006; van Emmerik 2006). Network research has also recognized that individuals seek difference resources from different individuals. Saint-Charles and Mongeu (2009) found that, individuals call upon alters for friendship or for expertise based on the nature of the situation and the availability of information. In social network terms, the structure of ties matter, where strong ties are seen as bonding and weak as bridging and thus bringing about different career outcomes (Granovetter, 1973, Burt, 2001). Our recent examination of the mentor or developmental networks of academic scientists have found that ego networks that are defined by the type of the relationship (e.g. support, advice, collaboration) tend to overlap (Melkers, Kiopa and Fonseca, 2008) and provide varying levels of developmental support accordingly. This study builds on that work to address the composition of the workplace networks of academic scientists. We address how the structure and content of relationships is developed and maintained over the time, and how it impact flow of the resources that are important for success and academic productivity in science. Data for this research are drawn from a large multi stage national study of women and men academic scientists in Research Intensive Universities in the U.S.

(NETWISE 2006-2009) representing six STEM fields. The first survey of the study was conducted online at the beginning of 2007and it yielded 1764 responses and provided information about developmental and professional networks of researchers, organizational features of their departments and their demographic information. The second survey planned for spring 2009 is designed to provide data on the dynamics of the networks of scientists.

The poster will present descriptive analysis of the developmental networks of men and women academic scientists in six STEM fields as well as causal model exploring how tie content and structure relates to the resources that social relationships may provide. This research moves beyond the understanding of ties as strong vs. weak by modeling faculty workplace relationships as multiplex and providing various resources valued in academic production, including the expertise on grant getting and publishing.

References

Burt, R. S. (1992). Structural holes: The social structure of competition, Harvard University Press.

Cummings, J. N. and M. C. Higgins (2006). "Relational instability at the network core: Support dynamics in developmental networks." Social Networks 28(1): 38-55.

Fox, M. and C. Colatrella (2006). "Participation, Performance, and Advancement of Women in Academic Science and Engineering: What is at Issue and Why." The Journal of Technology Transfer 31(3): 377-386.

Granovetter, M. S. (1973). "The Strength of Weak Ties." American Journal of Sociology 78(6): 1360.

Lin, C. P. (2006). "Gender differs: Modelling knowledge sharing from a perspective of social network ties." Asian Journal of Social Psychology 9(3): 236-241.

Lin, N. (2001). "Building a network theory of social capital." Social Capital: Theory and Research: 3-29.

Melkers, J., A. Kiopa, et al. (2008). "Mentoring the Scientific Workforce: Mentors and Constellations of Mentors in the Career Development of Academic Scientists.", Presented at 2008 APPAM Fall Research Conference, November 6-8, 2008.

Plickert, G., R. R. Côté, et al. (2007). "It's not who you know, it's how you know them: Who exchanges what with whom?" Social Networks 29(3): 405-429.

Podolny, J. M. and J. N. Baron (1997). "Resources and Relationships: Social Networks and Mobility in the Workplace." AMERICAN SOCIOLOGICAL REVIEW 62: 673-693.

Saint-Charles, J. and P. Mongeau (2004). Analysis of Interactions network in workgroup.

Seibert, S. E., M. L. Kraimer, et al. (2001). "A Social capital theory of career success [J]." Academy of Management Journal 44(2): 219-237.

van Emmerik, I. J. H. (2006). "Gender differences in the creation of different types of social capital: A multilevel study." Social Networks 28(1): 24-37.